Loading and Scrubbing

Gustaaf

Current Tile Timeline

- Tile goes to NSF mini-review April 11-12
  - Director's review March 21-22
    - Only one week to fix stuff before docs posted for NSF review…
  - Docs for director's review posted May 13
- So:
  - Export from CET to P6 today
  - Scrub 2/16-2/23 (2 hours per deliverable, 1 on BOE, 1 on RLS)
  - Week of 2/27 implement changes in P6
  - 3/3 export new schedule to CET
  - 3/6-8 enter new/corrected resources and design maturity in CET
  - 3/9-10 import in P6, generate reports for DR
    - And calculate bottom-up contingency
  - In parallel, write slides…
- Basically, preparation for a review 2 months away now has ~0 days of slack (to DR)….

Important Notes

- To reduce load on P.O., we are only doing transfers between P6 and CET for complete system
  - We cannot start scrubbing until the full system is loaded
  - When scrubbing starts is determined by last CAM/L3/IC to complete
- Please do communicate this, and the process, in particular slide 13, to your L3s/CAMs/ICs
  - Make sure they create time in their schedules!
- Please make sure uncosted labor categories (typically physicists, e.g. PhD students and postdocs) are in the rate table for your institution
  - We want this in the RLS as well
    - Will attract less scrutiny, but we will be asked about it (and need to account for/quantify the risk we don't have those people)

WBS Dictionary

- **CRUCIAL** part of the BOE; first question to NSF PDR review committee is
  - Evaluate and report on the completeness of the WBS sample selected by the project, and the accompanying definitions contained in the WBS dictionary. Are they a sufficient description of the proposed technical scope and the accompanying budget, schedule, and risk estimates?
- To be clear
  - A WBS dictionary describes each individual element or subassembly and lists the smaller elements of which it is comprised and the larger assembly within which it is integrated.
  - One per BOE; it's the first thing on the BOE
- An example from Phase-1 for one deliverable:
  - This BoE covers the cost of construction of the LTDB digital motherboards, the main boards housing all the digital components, the optical I/O interfaces and the analog input mezzanines. This includes the design, layout and construction of the printed circuit board (PCB), as well as procurement of generic components (POL converters, caps,…) and board assembly. It includes also the costs of prototypes and the intermediate steps required to validate the PCB design. 124 PCBs are needed for the detector.
- Make it pithy but with all the necessary info

BOE

US ATLAS	**US ATLAS HL-LHC Upgrade BASIS of ESTIMATE (BoE)**	**Date of Est: 2/10/2017** **Prepared by: Mark Oreglia Responsible Inst: University of Chicago Docdb #: HL-LHC-doc-28**

WBS number: 6.5.1.1	**WBS Title: Tile Calorimeter Main Board**

WBS Dictionary Definition:
This WBS covers the fabrication of the main boards (MB) which manage the data flow, power distribution, monitoring, and calibrations of the Tile Calorimeter (TileCal) front-end electronics. This includes the design, layout and construction of the printed circuit board (PCB), procurement of commercial components, and board assembly, burn-in and testing. It includes the costs of prototypes and the intermediate steps required to validate the board design. 1,024 boards are needed for the detector.

Estimate Type (check all that apply – see BOE Report for estimate type by activity):

___ Work Complete
___ Existing Purchase Order
___ Catalog Listing or Industrial Construction Database
_X_ Documented Vendor Estimate based on Drawings/ Sketches/ Specifications
_X_ Engineering Estimate based on Similar Items or Procedures
_X_ Engineering Estimate based on Analysis
_X_ Expert Opinion

Supporting Documents (including but not limited to): Attachments 1-5

For NSF items, already in docdb

BOE

US ATLAS HL-LHC Upgrade BASIS of ESTIMATE (BoE)		**Date of Est:** **2/10/2017** **Prepared by:** **Mark Oreglia** **Responsible Inst: University of Chicago** **Docdb #: HL-LHC-doc-28**
WBS number: 6.5.1.1	**WBS Title: Tile Calorimeter Main Board**	

WBS Dictionary Definition:
This WBS covers the fabrication of the main boards (MB) which manage the data flow, power distribution, monitoring, and calibrations of the Tile Calorimeter (TileCal) front-end electronics. This includes the design, layout and construction of the printed circuit board (PCB), procurement of commercial components, and board assembly, burn-in and testing. It includes the costs of prototypes and the intermediate steps required to validate the board design. 1,024 boards are needed for the detector.

Estimate Type (check all that apply – see BOE Report for estimate type by activity):

___ Work Complete
___ Existing Purchase Order
___ Catalog Listing or Industrial Construction Database
_X_ Documented Vendor Estimate based on Drawings/ Sketches/ Specifications
_X_ Engineering Estimate based on Similar Items or Procedures
_X_ Engineering Estimate based on Analysis
_X_ Expert Opinion

Supporting Documents (including but not limited to): Attachments 1-5

Number needed for detector (Additional numbers given in body)

BOE

US ATLAS HL-LHC Upgrade BASIS of ESTIMATE (BoE)		**Date of Est:** **2/10/2017** **Prepared by:** **Mark Oreglia** **Responsible Inst: University of Chicago** **Docdb #: HL-LHC-doc-28**
WBS number: 6.5.1.1	**WBS Title: Tile Calorimeter Main Board**	

WBS Dictionary Definition:

This WBS covers the fabrication of the main boards (MB) which manage the data flow, power distribution, monitoring, and calibrations of the Tile Calorimeter (TileCal) front-end electronics. This includes the design, layout and construction of the printed circuit board (PCB), procurement of commercial components, and board assembly, burn-in and testing. It includes the costs of prototypes and the intermediate steps required to validate the board design. 1,024 boards are needed for the detector.

What is it?

Estimate Type (check all that apply – see BOE Report for estimate type by activity):

___ Work Complete
___ Existing Purchase Order
___ Catalog Listing or Industrial Construction Database
_X_ Documented Vendor Estimate based on Drawings/ Sketches/ Specifications
_X_ Engineering Estimate based on Similar Items or Procedures
_X_ Engineering Estimate based on Analysis
_X_ Expert Opinion

Supporting Documents (including but not limited to): Attachments 1-5

BOE

	US ATLAS **HL-LHC Upgrade** **BASIS of ESTIMATE (BoE)**	**Date of Est:** **2/10/2017** **Prepared by:** **Mark Oreglia** **Responsible Inst: University of Chicago** **Docdb #: HL-LHC-doc-28**

WBS number: 6.5.1.1	**WBS Title: Tile Calorimeter Main Board**

WBS Dictionary Definition:
This WBS covers the fabrication of the main boards (MB) which manage the data flow, power distribution, monitoring, and calibrations of the Tile Calorimeter (TileCal) front-end electronics. This includes the design, layout and construction of the printed circuit board (PCB), procurement of commercial components, and board assembly, burn-in and testing. It includes the costs of prototypes and the intermediate steps required to validate the board design. 1,024 boards are needed for the detector.

Estimate Type (check all that apply – see BOE Report for estimate type by activity):

___ Work Complete
___ Existing Purchase Order
___ Catalog Listing or Industrial Construction Database
_X_ Documented Vendor Estimate based on Drawings/ Sketches/ Specifications
_X_ Engineering Estimate based on Similar Items or Procedures
_X_ Engineering Estimate based on Analysis
_X_ Expert Opinion

Supporting Documents (including but not limited to): Attachments 1-5

What do you need to do? Include all phases in RLS

BOE

- Cost table will come from P6/COBRA
- Leave risk section empty for now

- Parts selection, negotiating select lots, inventory, test, stock: 0.1 EE, 0.1 ET.

Then there are 15 5-week cycles of MB production. The first lot of 40 MB has a learning-curve factor, taking the same amount of time as the subsequent 13 batches of 80 MB. The last cycle produces the final 20 MB.

For EACH CYCLE the tasks require 0.14 FTE EE, 0.07 FTE ET, 0.16 FTE UG's

- Manage parts, short-test bare PCBs (ET)
- Oversee PCB assembly, initial testing, debugging with assembly house (EE,ET)
- Mount in burn-in fixtures; supervise students, test, document (EE,ET,UG)
- Diagnose, document, and repair failures (EE, ET)
- Inventory, document, crate and ship to CERN (ET)

At completion of production, the head EE will spend time at CERN for final QA, documentation, and integration.

- Acceptance test training at CERN and system integration meetings: 0.34 FTE EE

Summary FTE's for production: 2.4 EE, 1.1 ET, 2.3 UG.
The estimate of schedule and effort agrees well with that expended in the production of the current TileCal motherboards.

In addition to the costed labor, production will require 20% of the faculty PI and 50% of a postdoctoral scholar and some fraction of graduate student participation as uncosted labor. Additionally, some of the mounting and acceptance testing at CERN is expected to be done by uncosted labor by collaborators or Chicago postdocs and students stationed at CERN.

Minimize such numbers
Only use if needed for "story", and if so, round

Exact numbers in Table, don't change text if change resources

Include estimate of uncosted effort needed

BOE

necessary, based on our experience in constructing the demonstrator as well as the motherboard production during 2000-2003; the average cost of a week at CERN is estimated to be $2570, exclusive of indirect costs. Also included for the PCB assembly process are commuter trips to Schaumburg, IL, so the EE can debug the process with the assembly house engineers; this is a local trip incurring only mileage reimbursement of $50 per trip; there is no overhead on this travel by EDG staff.

We expect NSF to ask for travel cost breakdown → include table with typical flight, hostel, etc. costs and how you defined typical (e.g. “avg from 10 trips in past 3 years”)

A Word on Effort Needed

- Please DO NOT reach out to Manny directly
- Do not underestimate the time it takes to load
  - E.g. a deliverable with 100 activities
    - Avg of two resources per activity → 200 items to load
    - Avg of 3 mins per item (make sure you have the right resource, value, etc) → 600 mins
  - You need to make time for this!
- For now will use word documents for BOEs, so don't need to do that
  - Until format is set in stone
- Need scrubbed RLS to
  - Insert task-based maturity (will serve as basis for contingency)
    - Will scrub in second round
  - "Risk tasks" for risk assessment

Slides from past weeks for reference

Sequence

❖ Getting a validated RLS ready requires the following steps:

1. Task list, durations and dates loaded into P6 during 1-on-1 sessions
2. Schedule is exported from P6 into CET
3. Load resources in CET: labor hours and M&S $$
   - If at this point realize some tasks are missing, keep list (do NOT add activities at this stage)
4. When done, hours and M&S $$ are exported from CET into P6 and PO generates reports for scrubbing from COBRA
5. Scrubbing
   - Can lead to new activities, schedule changes, …
6. Make relevant changes to P6 (from steps 3 and 5)
   - Can be one-on-one or email depending on complexity
7. Export revised RLS to CET
8. Load/fix new/relevant activities in CET
9. Back to P6, generate reports

Using the CET

- To ease the load on Manny and allow directed prioritization of PO work, Maria, Gustaaf and Xiaofeng will collect all questions/comments for Manny. *Please do not contact him directly*
- The CET has the schedule you put in P6
  - You need to add resources for each activity. Units are hours for labor, $ for M&S
    - What matters are the raw numbers: the hours and base $$ get exported to P6, which will do its own fringe/ICR/… loading
    - Total costs in CET are indicative to help you x-check inputs
    - Note that M&S gets inflated by 3%, CET assumes you are putting in FY15 costs
      - This is not what you did in the past, can have large impact (e.g. 15+% cost increase for item purchased in 2020)
      - We are discussing how to improve this, but live with it for now
- The CET is slow: after a resource is entered, 5-10s "dead time" while things reload
  - Looking into it, but live with it for now

BOE

- In the upper right-hand corner there is a “BOE” button
  - This will open a new tab where you can cut-and-paste your BOE info
  - Please do this - will evaluate during scrubbing if we will use this for BOEs or “traditional” word documents
- When loading individual resources, you will see you also have an opportunity to enter some text
  - In Phase-1, we did this for activities > 200 hours
  - For now, leave empty. We will discuss during scrubbing, evaluate comments from director’s reviews, …

For now will use word documents

Small Things

- Cannot delete resource once added, so set hours/$$ to zero
- FYs are DOE FYs, not NSF years
- Some …M or …T (or other) tasks may have been forgotten, see step 3 on slide 2

Scrubbing

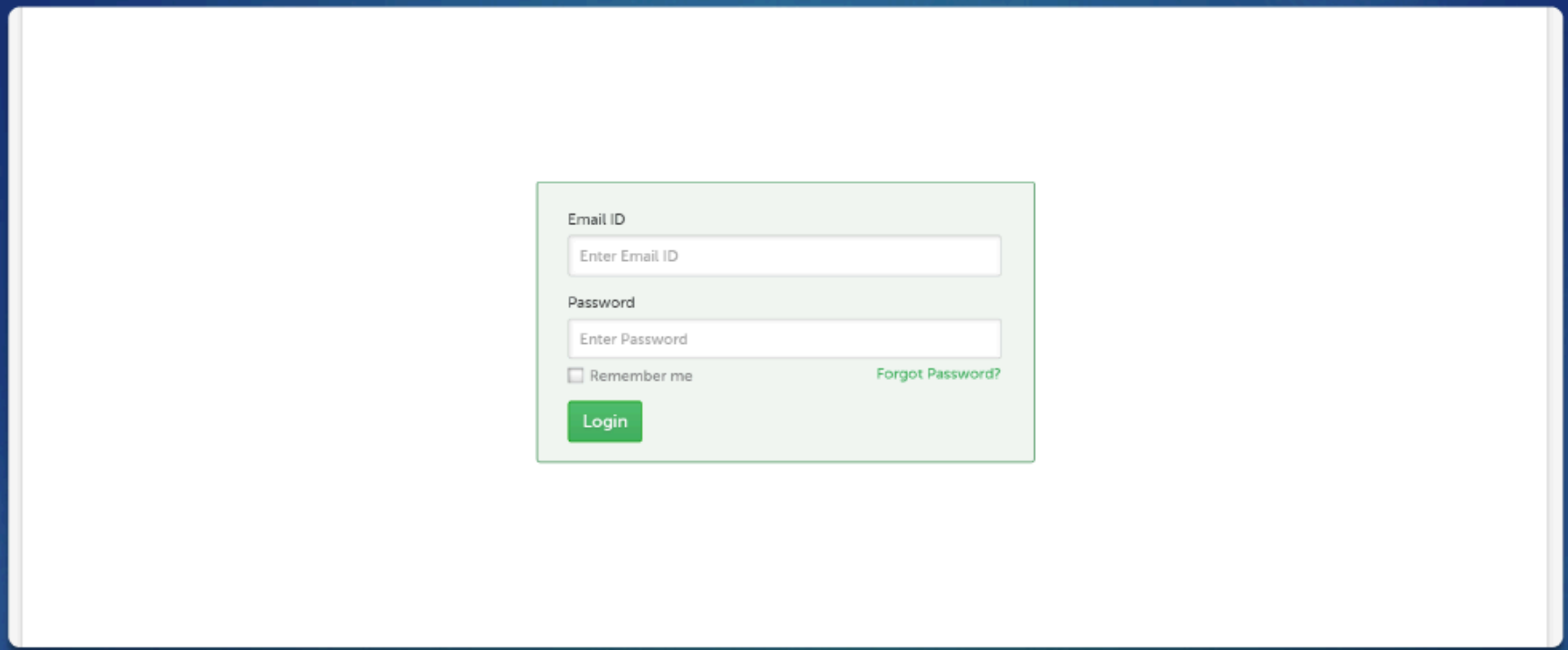
- Expect to start from BOE
  - What are you building? How did you estimate the resources needed?
- Then go through RLS
- Standing slots: will need at least two meetings/week to make it by May 1…
  - Mondays noon - 2 pm Eastern
  - Thursdays noon - 2 pm Eastern
  - Fridays 8 - 10 am Eastern

CET – End User

Quick Start Guide

Prepared by: Emmanuel Abela

manny.abela@mrcpmcs.com



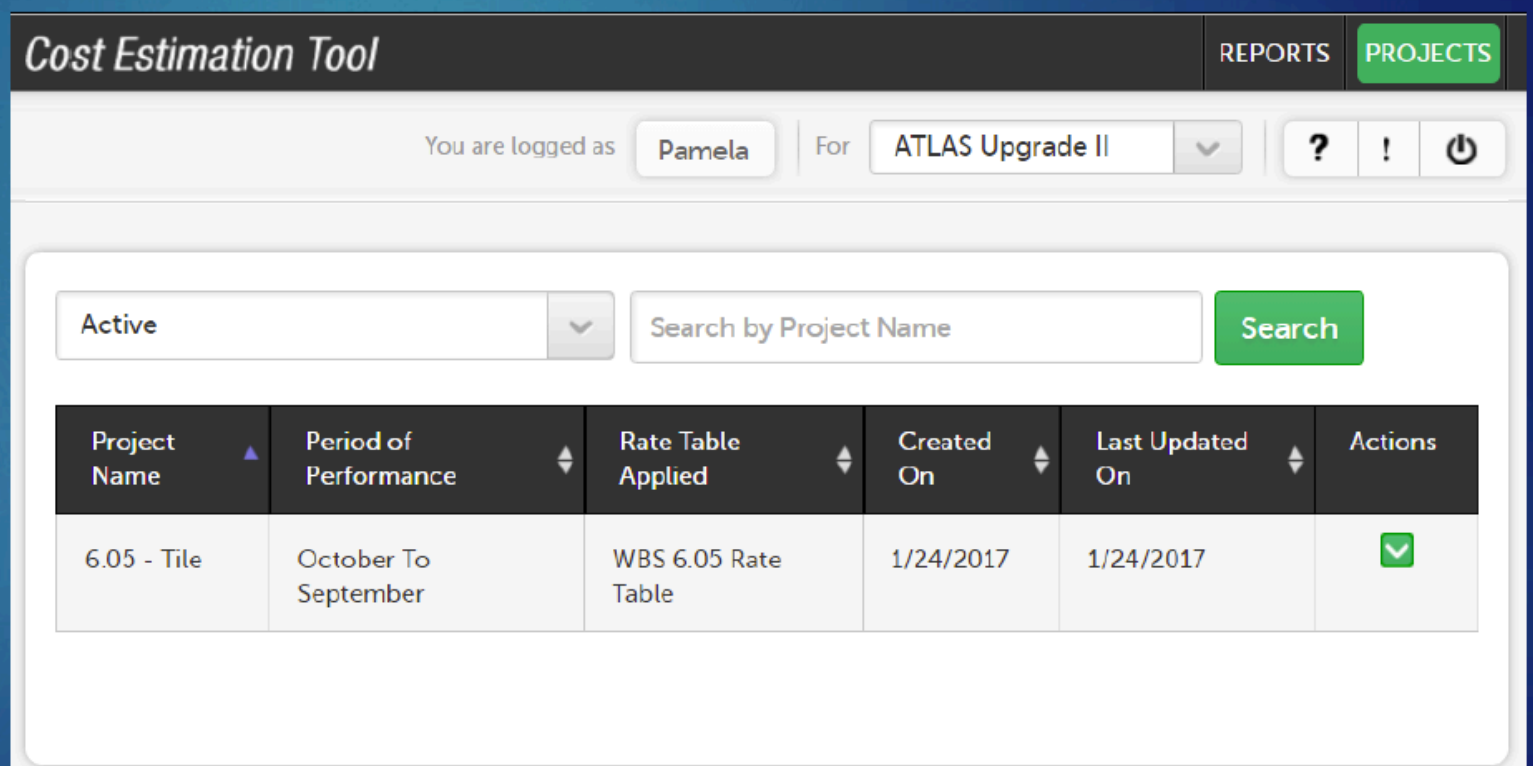
Login Screen

Enter the url mrc-cet.com in the address bar of your Browser to reach the login screen for CET.

Enter your credentials to log in.

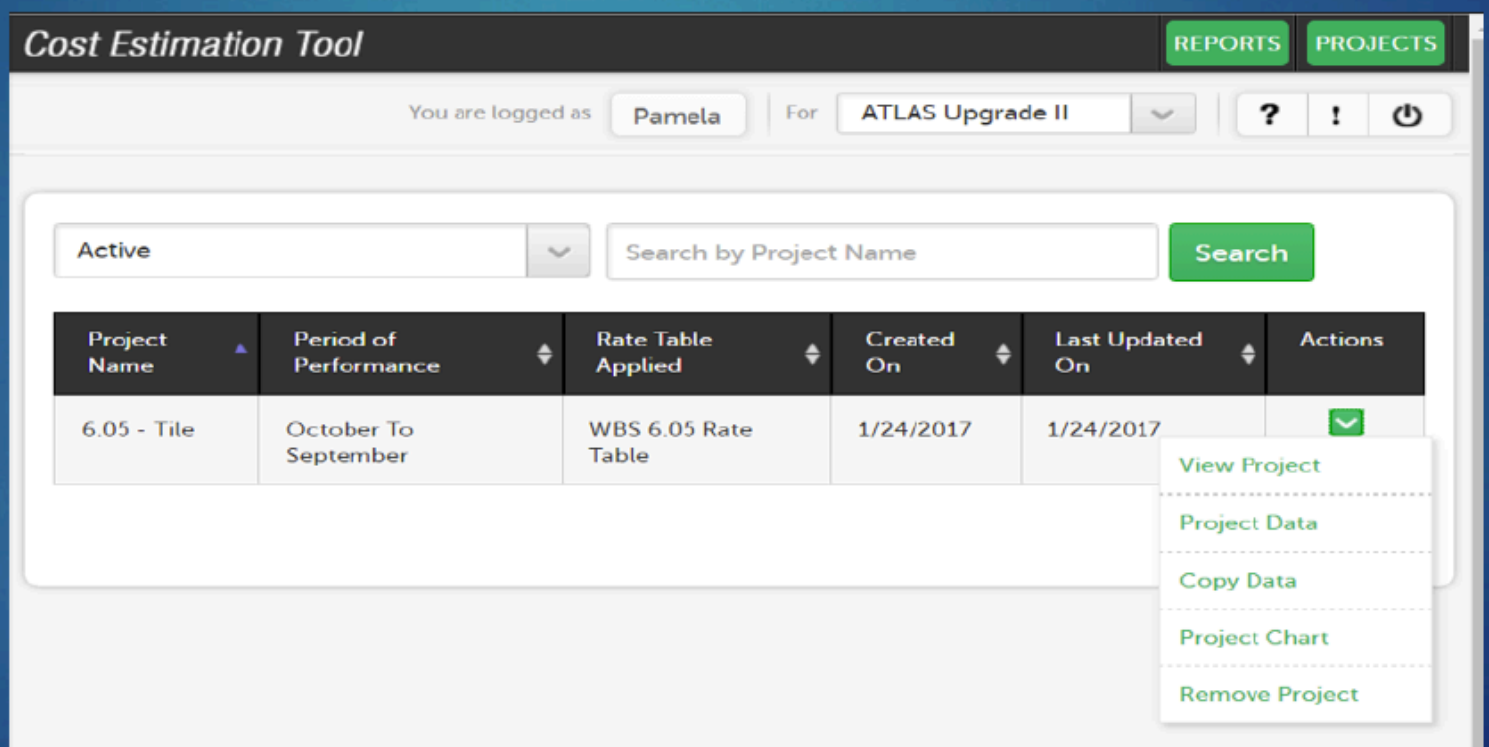
Navigation Bar

- Logging in leads to the PROJECTS page.



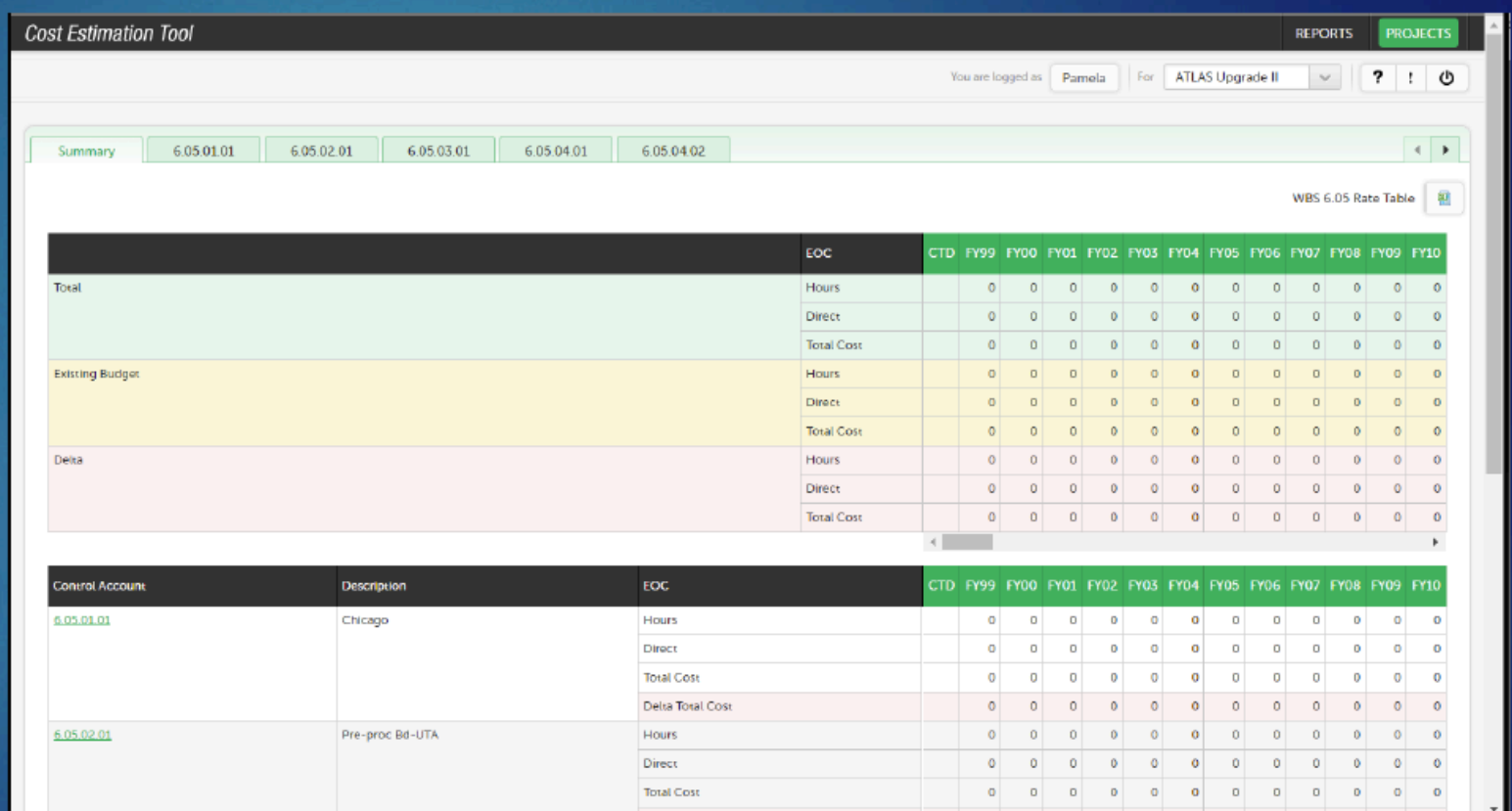
Projects Tab

- Project data is organized by the level 2 branches of the WBS.
- Enter a level 2 of the project by clicking on the green check box in the ACTIONS column and select VIEW PROJECT.



Project Summary

- The Summary tab shows the totals of all the control accounts and the delta of any changes made.
- Individual control accounts can be accessed by selecting them on the tabs at the top of the page or by clicking on the highlighted green number in the Control Account column.

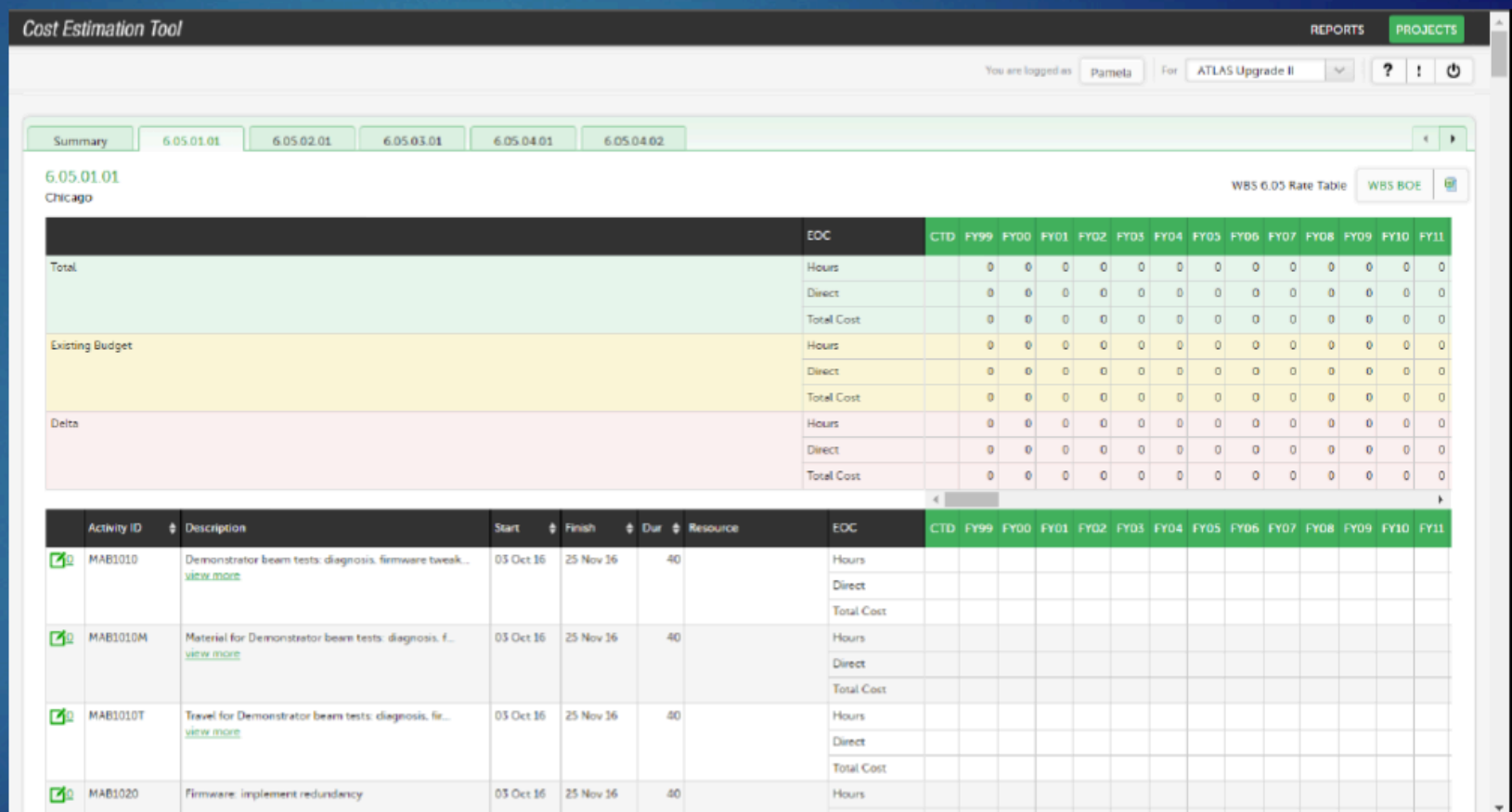


Control Account Summary

The following actions can be performed on a control account once it is selected:

- Viewing totals of the control account
- Adding resources to an activity
- Editing the units of an assigned resource.

Note that milestone activities are locked and cannot be modified. We purposely loaded them in CET for schedule continuity.

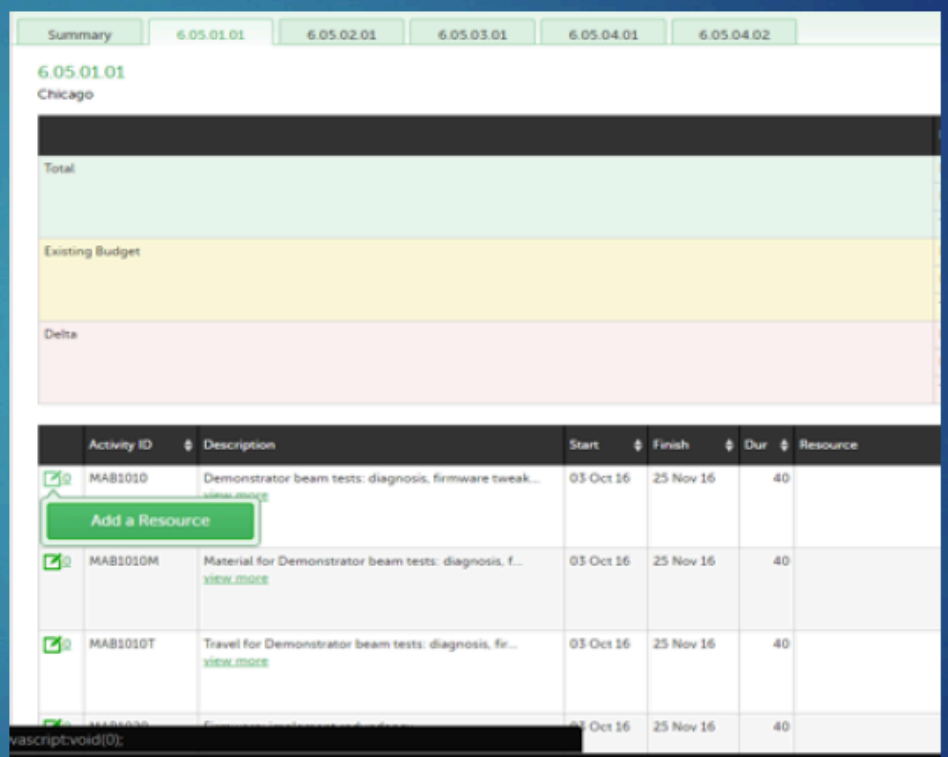


Control Account Tab

Adding a new Resource

Hover your mouse over the green note box to the left of the Activity ID of the task you are modifying.

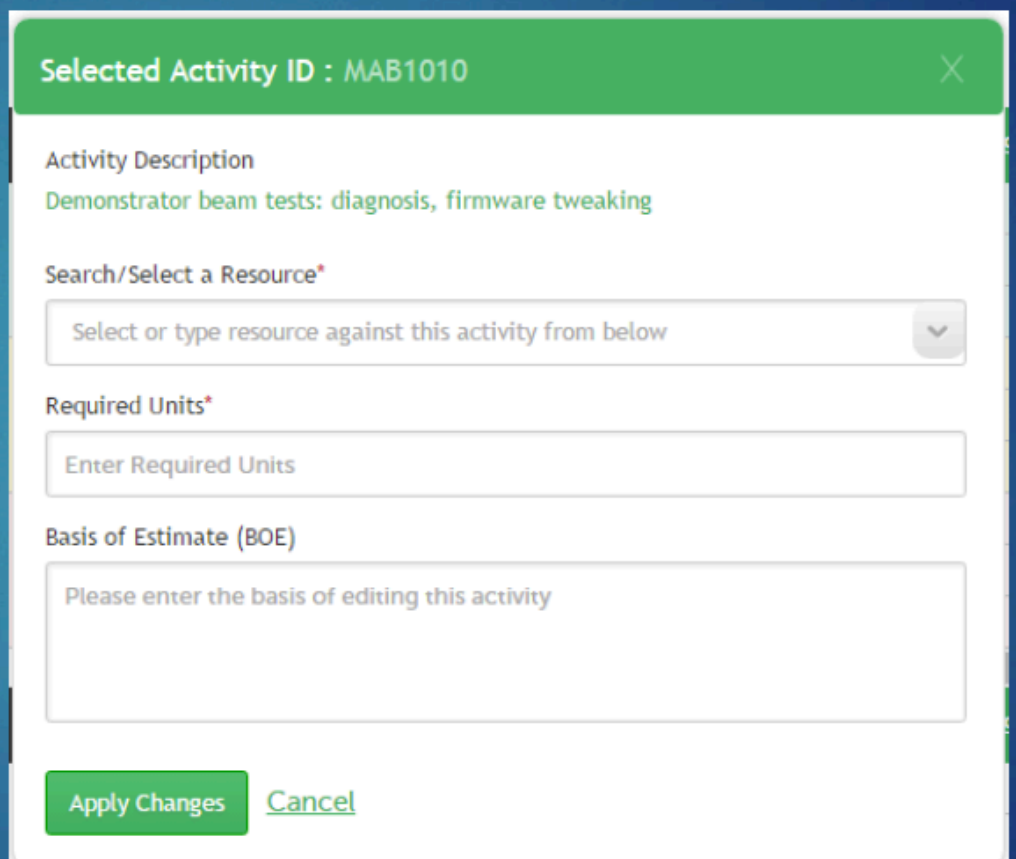
- A Window will appear.
- Select ***Add a Resource***.
- A Resource Wizard appears.



Control Account Tab

Resource Wizard

- Select a Resource from the drop-down list
- Enter Required Units.
- Enter Basis of Estimate notes (optional).
- Click on ***Apply Changes*** button



Control Account Tab

Editing Existing Units

The number of units in a resource assignment can be directly edited by clicking on the desired unit amount that is highlighted in green.

- A window will appear displaying the current number of units
- Enter the new number of units.
- Enter justification for change.
- Click on ***Apply Changes*** button to save.